die such that substantially no over-cutting or undercutting generating a defect at the arcuate die edge or corner occurs.

27. A method as claimed in any of the preceding claims to form a tapered dice lane having arcuate walls tapering inwards in a direction away from the laser beam by varying a width of the dice lane as the laser scans through the substrate wherein the selected combination is modified to give a finely controlled taper and smooth die sidewalls, and thereby increase die strength of the resultant die.

28. A method as claimed in any of the preceding claims, wherein the laser is a Q-switched laser device.

29. A method as claimed in any of the preceding claims, wherein a laser beam from the laser is directed by rotatable mirrors.

30. A method as claimed in any of the previous claims, wherein the substrate is mounted on a tape and energy of final scans of the laser is controlled substantially to prevent damage to the tape.

31. A method as claimed in claim 30, wherein the tape is substantially transparent to ultraviolet radiation.

32. A method as claimed in claim 31, wherein the tape is polyolefin-based.

33. An apparatus for program-controlled dicing of a substrate comprising at least one layer, the apparatus comprising: a pulsed laser; and program control means and associated data storage means for controlling the pulsed laser using a laser cutting strategy file, stored in the data storage means, of at least one respective selected combination of pulse rate, pulse energy and pulse spatial overlap of pulses produced by the laser at the substrate and data representative of at least one respective selected plurality of scans of the respective at least one layer by the pulsed laser necessary to cut through the respective at least one layer; such that in use a resultant die has at least a predetermined die strength and a yield of operational die equals at least a predetermined minimum yield.

34. An apparatus as claimed in claim 33, wherein the program control means includes control means for varying at least one of pulse rate, pulse energy and

pulse spatial overlap for controlling the laser subject to the at least one respective selected combination.

35. An apparatus as claimed in claims 33 or 34 including telecentric scan lens means for scanning a laser beam from the laser across the substrate.

36. An apparatus as claimed in claim 35 including laser power measuring means for mapping a laser energy density received in a focal plane of the telecentric scan lens to produce a laser energy density map of a field of view of the telecentric lens using the selected combination of pulse rate, pulse energy and pulse spatial overlap of pulses for storing the laser energy density map as an array in the data storage means for modifying the at least one respective selected combination to compensate for irregularities, introduced by the telecentric lens, of laser energy density at the substrate.

37. An apparatus as claimed in any of claims 33 to 36 further comprising gas handling means for providing a gaseous environment for the substrate for controlling a chemical reaction with the substrate at least one of prior to, during and after dicing the substrate to enhance strength of the resultant die.

38. An apparatus as claimed in claim 37, wherein the gas handling means includes gas delivery head means for uniformly delivering gas to a cutting region of the substrate.

39. An apparatus as claimed in claim 37 or 38, wherein the gas handling means comprises control means for controlling at least one of flow rate, concentration, temperature, type of gas and a mixture of types of gases.

40. An apparatus as claimed in any of claims 37 to 39, wherein the gas handling means is arranged to provide an inert gas environment for substantially preventing oxidation of walls of a die during machining.

41. An apparatus as claimed in any of claims 37 to 39, wherein the gas handling means is arranged to provide an active gas environment.

42. An apparatus as claimed in claim 41, wherein the gas handling means is arranged to etch walls of a die with the active gas to reduce surface roughness of the walls, and thereby increase die strength.

43. An apparatus as claimed in claim 41, wherein the gas handling means is arranged to etch walls of a die with the active gas substantially to remove a heat affected zone produced during machining, and thereby increase die strength.

44. An apparatus as claimed in claim 41, wherein the gas handling means is arranged to etch walls of a die with the active gas to reduce debris, produced during machining, adhering to surfaces of machined die.

45. An apparatus as claimed in any of claims 33 to 44 further comprising a galvanometer-based scanner for producing die with rounded corners by scanning a laser beam along a curved trajectory at corners of the die, wherein the selected combination is arranged to maintain the selected pulse spatial overlap between consecutive laser pulses around an entire circumference of the die.

46. An apparatus as claimed in any of claims 33 to 45, wherein the selected combination is arranged to control laser pulse delivery at an arcuate portion or corner of a die edge such that substantially no over-cutting or undercutting occurs which would generate a defect at the die edge.

47. An apparatus as claimed in any of claims 33 to 46 arranged for forming a tapered dice lane having arcuate walls tapering inwards in a direction away from the laser beam by varying a width of the dice lane as the laser scans through the substrate wherein the selected combination is modified to give a finely controlled taper with smooth die walls, and thereby increase die strength of the resultant die.

48. An apparatus as claimed in any of claims 33 to 47, wherein the laser is a Q-switched laser device.

49. An apparatus as claimed in any of claims 33 to 48, including rotatable mirrors for directing a laser beam from the laser on the substrate.

50. An apparatus as claimed in any of claims 33 to 49, arranged for a substrate mounted on a tape, wherein the laser is controlled in final scans of the substrate not substantially to damage the tape.

51. An apparatus as claimed in claim 50, wherein the tape is substantially transparent to ultraviolet light.

52. An apparatus as claimed in claim 51, wherein the tape is polyolefin-based.